the development of research is entrusted to indifferent and irresponsible authorities it is difficult to hope for better things. Scientific discoveries may not increase the beauty of the earth, but we live in a practical age and must be practical. To be lulled by a sense of false security is to commit national suicide.

## *INTERNATIONAL ENGINEERING CONGRESS.*

THE International Engineering Congress to be held at Glasgow from Tuesday to Friday next week, September 3–6, will be an important congregation of representatives of all branches of engineering practice. The Congress may almost be regarded as a federated meeting of technical societies, for seven of the nine sections are in charge of such organisations. The suggestion that technical societies should hold simultaneous meetings this year in Glasgow was made by the Institution of Engineers and Shipbuilders in Scotland, and it developed into the scheme for an International Engineering Congress.

Lord Kelvin has accepted the honorary presidency of the Congress, and Mr. James Mansergh, F.R.S., is the president. Mr. Mansergh will deliver a short address on Tuesday, and the members will afterwards meet in their respective sections in the University buildings. A large number of papers are to be read, and among them several of scientific interest. The following is a list of the sections, and of a few of the subjects to be brought forward for discussion:—

*Section I.—Railways.*—Chairman, Sir Benjamin Baker. The economy of electricity as a motive power on railways at present driven by steam, by Prof. C. A. Carus-Wilson.

*Section II.—Waterways and Maritime Works.*—Chairman, Sir John Wolfe Barry, K.C.B., F.R.S. Novel plant employed in transporting the excavations on the Chicago Drainage Canal Works, by Mr. Isham Randolph; the improvement of the Lower Mississippi by the Mississippi River Commission, by Mr. J. A. Ockerson; irrigation in the Nile Valley and its future, by Mr. William Willcocks, C.M.G.; recent improvements in the lighting and buoying of coasts, by Mr. D. Stevenson, and by Baron de Rochemont.

*Section III.—Mechanical Engineering (Institution of Mechanical Engineers).*—Chairman, Mr. W. H. Maw. Effect of temperature on cooling water in high speed automobiles, by Prof. H. S. Hele-Shaw, F.R.S.; trials of steam turbines for driving dynamos, by the Hon. C. A. Parsons and Mr. G. Gerald Stoney; application of metric system to workshops, by Mr. Arthur Greenwood; power required to drive marine engine works and for electric lighting, by Mr. James Crighton and Mr. W. G. Riddell.

*Section IV.—Naval Architecture and Marine Engineering (Institution of Naval Architects).*—Chairman, the Right Hon. the Earl of Glasgow. The chief characteristics of the naval development of the nineteeth century, by Sir Nathaniel Barnaby, K.C.B.

*Section V.—Iron and Steel (Iron and Steel Institute).*—Chairman, Mr. William Whitwell. Report on the nomenclature of metallography, by the committee of the Iron and Steel Institute; on the spectra of flames at different periods during the basic Bessemer blow, by Prof. W. N. Hartley, F.R.S., and Mr. Hugh Ramage; on iron and copper alloys, by Mr. J. E. Stead.

*Section VI.—Mining (Institution of Mining Engineers).*—Chairman, Mr. James S. Dixon. Presidential address, by Sir William Thomas Lewis, Bart.; alternating currents, and their possible application to mining, by Mr. S. F. Walker; a new diagram of work, by Mr. H. W. G. Halbaum.

*Section VII.—Municipal Engineering (Incorporated Association of Municipal and County Engineers).*—Chairman, Mr. E. George Mawbey. Research into the system of sewage purification by bacterial and other methods, by Mr. K. F. Campbell; treatment of sewage, by Lieut.-Col. A. S. Jones, V.C.; sewage disposal, by Mr. A. B. M'Donald.

*Section VIII.—Gas Engineering (Institution of Gas Engineers).*—Chairman, Mr. George Livesey. Electrolysis of gas pipes, &c., by Dr. Leybold; water gas as an adjunct in the manufacture of coal gas, by Prof. Vivian B. Lewes; Emile Gobbe's process for the production of water gas, by Mr. Fernand Bruyere.

*Section IX.—Electrical (Institution of Electrical Engineers).*—Chairman, Mr. W. E. Langdon. Electricity supply meters of the electrolytic type, by Mr. J. R. Dick; Kelvin's electric measuring instruments, by Prof. M. Maclean; continuous-current dynamo design, by Mr. H. A. Mavor; the use of electricity in the propulsion of road vehicles, by Mr. A. R. Sennett.

Advantage will be taken of the presence of a large number of engineers in Glasgow to open the new "James Watt Engineering Laboratories." These laboratories are being erected and equipped at a cost of more than 40,000*l.*, the funds being raised partly by subscriptions from the citizens of Glasgow and neighbourhood, partly by a grant of 12,500*l.* from the Bellahouston Trust, and the remainder from funds already at the disposal of the University Court. Lord Kelvin will preside at the opening.

Arrangements have been made for visits to works of interest to members of all branches of engineering, and for a number of excursions. There will also be a banquet, a reception by the Lord Provost, and a ball, so that the social aspects of the Congress are pleasing to contemplate. These pleasures, combined with the meetings of the sections and visits to the International Exhibition, should make the Congress memorable to all who take part in it.

## *NOTES.*

THE seventieth birthday of Prof. Eduard Suess, who for more than forty years has occupied the chair of geology in the University of Vienna, and is universally regarded as the greatest of living geologists, has called forth hearty greetings from all parts of the world. Prof. Suess was born in London on August 20, 1831, his father being at that time a merchant in the City; but, while a sympathetic friend of England, he has always remained a true Austrian, and his life-work as geologist, palæontologist and politician has been carried out in his own country. His researches, while largely palæontological, have covered a wide range, and they have led him to grasp more fully than others the problems in the ancient physical geography of the earth, which he dealt with in his brilliant work, "Antlitz der Erde." As remarked by a correspondent in the *Times*, Prof. Suess, to his own countrymen, "has been much more than a distinguished pioneer in science. He has been a living example of enlightened patriotism and devotion to the public welfare, and an indefatigable reformer, whose works will long remain a monument to his memory."

AMONG the many objects that attracted attention during the recent meeting of the International Congress of Zoologists at Berlin, few were more noteworthy than a large mounted adult male gorilla, exhibited by Herr Umlauff, of Hamburg. This specimen is remarkable not only for its size, which rivals, if it does not exceed, that of any example of the gorilla previously obtained, but also because its exact history is known. It was shot by Herr H. Pascen, of Schwerin, the representative of a Hamburg mercantile firm, in Yaunde, in the interior of the German Colony of Kamerun, about fifteen days' journey from the coast, on April 15, 1900. It has been hitherto generally believed that the gorilla is only to be found in Gaboon and the adjoining districts of French Congo immediately under the Equator; but it now appears that the range of this Anthropoid Ape extends further north into the interior of Kamerun. The specimen in question has, as we are informed, been acquired by Mr. Walter Rothschild for the Tring museum.

THE fifth International Congress of Criminal Anthropology will be held at Amsterdam on September 9-14.

THE death is announced of Admiral de Jonquières, who became a membre libre of the Paris Academy of Sciences in 1863, and was renowned for his works in geometry.

IN addition to the papers already mentioned to be read before the Zoological Section at the forthcoming meeting of the British Association, it is hoped that Mr. J. Stanley Gardiner will give an account of his recent researches upon the coral islands of the Maldives.

A REMARKABLE discovery of Palæolithic implements has lately been made on the estate of the Marquis of Ailesbury, at Knowle Farm, on the borders of Savernake Forest. Between 200 and 300 implements (according to a report in the *Times*) have been obtained from a pit which has been opened in a high-level valley gravel. The implements, which are mostly made of flint, have been well fashioned, and some have been finely polished, as if from the effects of blown sand. They include forms familiar from the Somme valley, and also from Hoxne and other places in this country.

THE new milk standard adopted by the Board of Agriculture will come into force on September 1. The regulations state that when a sample of milk (not being sold as skimmed, or separated, or condensed milk) contains less than 3 per cent. of milk-fat, or 8·5 per cent. of milk-solids other than milk-fat, it will be presumed for the purposes of the Sale of Food and Drugs Act, 1875 to 1899, until the contrary is proved, that the milk is not genuine. Where a sample of skimmed or separated milk (not being condensed milk) contains less than 9 per cent. of milk-solids, it will be regarded as not genuine.

THE death of Dr. Adolf Fick, late professor of physiology at the University of Würzburg, is announced in the *Times*. Dr. Fick was born at Cassel in 1829, became professor of physiology at the University of Zurich in 1856, and in 1868 was called to the chair of physiology at the University of Würzburg, a position that he held until his retirement a few months ago. Among his published works may be mentioned a treatise on medical physics, 1857, which passed through many editions; a compendium of physiology, 1860 (third edition 1882); "Anatomy and Physiology of the Senses," 1862; "Mechanical Work and the Production of Heat during Muscular Action," 1882; "Ursache und Wirkung," 1882; "Versuch über die Wahrscheinlichkeiten," 1883. Prof. Fick was also an active contributor to the leading scientific reviews, and furnished many important papers to the records of his University.

THE Paris correspondent of the *Lancet* announces that legal authority has just been given for the creation of a fund for scientific research. It is divided into two sections, and its object is the promotion of purely scientific work relative (*a*) to the discovery of new methods of treatment of the diseases which attack man, domestic animals, and cultivated plants; and (*b*) to the discovery, apart from the medical sciences, of the laws which govern natural phenomena (mechanics, astronomy, natural history, physics, and chemistry). The income of the fund will be derived from the following sources:—(1) Grants made by the Government, by the departments, by the communes, by the colonies, and by other sections of the population. (2) Gifts and bequests. (3) Individual or collective subscriptions. (4) Grants deducted from the portion of the proceeds of the *pari-mutuel* assigned to philanthropic or charitable purposes locally; the annual amounts of these grants, which will not be less than 125,000 francs (5000*l.*), will be fixed each year on the application of the council of management by the special commission held at the Ministry of Agriculture. (5) Interest of money invested in Government securities or deposited with the Treasury. The fund is subject to the authority of the Ministry of Public Instruction, and is managed by a council assisted by a technical commission concerned with the grants.

THE New York Board of Health has distributed a circular of information, prepared by Dr. H. M. Biggs, upon the cause and prevention of malarial fever. This course has been taken because malarial fever is prevalent in certain boroughs of New York City, and is likely to extend on account of the extensive excavations and consequent formation of rain-pools in various parts of these boroughs, if means are not employed for its prevention. The circular states that the following simple precautions suffice to protect persons living in malarial districts from infection:—(1) Proper screening of the house to prevent the entrance of the mosquitoes. The chief danger of infection is at night, inasmuch as the Anopheles bite mostly at this time. (2) The confinement and continuous screening of persons in malarial districts who are suffering from malarial fever. (3) The administration of quinine in full doses to malarial patients to destroy the malarial organisms in the blood. (4) The removal of the breeding places of the mosquitoes through drainage, filling up of holes and surface pools, and emptying of tubs, pails, &c., which contain stagnant water. (5) In pools which cannot be drained or filled, the destruction of the mosquito larvæ by the use of petroleum thrown upon the surface, by the introduction of minnows and other small fish which eat the larvæ, or by both methods.

THE removal of the astronomical instruments from the Observatory at Pekin, as a part of the German loot, has already been mentioned in these columns. No particulars of the action have come under our notice, but the right of Germany to the instruments has just been questioned, so that the subject is still under discussion.

WITH the intention of directing attention to the cultivation of the vine in the colonies, Sir James Blyth, Bart., contributes to the *Chamber of Commerce Journal* for September an instructive article upon vine culture. His remarks upon the value of scientific investigations in connection with the industry are of interest. It is pointed out that owing to the invasion of phylloxera, and the consequent scientific discoveries for its prevention or extermination, labour on the vineyards has become continuous throughout the year. It is a common remark amongst the present proprietors of the Médoc, that in their fathers' time the vines were simply pruned, the land ploughed four times a year, and the grapes gathered at the vintage, leaving all else to nature and the seasons. Now, from the moment the grapes are gathered, scarcely a week—certainly not a month—passes, but some process for the defence of the roots, the stems, or the leaves takes place. The greater care exercised in planting, and the experience acquired in combating all the enemies to the well-being of the vine, promise not only to conquer these insidious fungoid and insect pests, but vastly to increase the proportional productivity of the areas under vines. For instance, there has been a considerable increase in the fecundity of the vine since steps have been taken to regenerate the vineyards which have been affected by phylloxera. This may be judged by the fact that, whereas in 1875, which, as is well known, was a record year in France for quantity as well as quality, an exceptional average yield of 294 gallons per acre was produced, the average yield in 1900 was as much as 343 gallons per acre.

PROF. OTTO NORDENSKJÖLD is at Malmö, Sweden, making arrangements for his South Polar Expedition. A Reuter message says he has made the following statement to a Press representative as to the plan and object of his expedition :—"As soon as the *Antarctic* returns from the expedition which she has made to Spitsbergen for meridian measurements, we start from Göteborg, certainly not later than October 1. From Göteborg we shall proceed to England, and thence to Buenos Ayres and Tierra del Fuego, whence we shall make our way to the Antarctic regions. We shall endeavour to push as far south as possible with the *Antarctic;* and, when winter comes on, we shall send a party on shore to winter. That party will probably consist of six persons, of whom I shall be one. We shall build a small hut for ourselves, and engage in meteorological, magnetic, hydrographic, and other scientific observations. As soon as we have landed, the *Antarctic* will return to Tierra del Fuego ; and a scientific observer, who will sail with her, will conduct the researches in that hitherto little explored country. In this way we shall be able to work in two detachments, and make as much use of our time as possible. Prof. Ohlin, of Lund, and M. K. A. Andersson will accompany me as zoologists. Dr. Bodman will come as hydrographer and magnetician, M. Skottoberg as botanist, and Dr. E. Ekolof as medical officer. Captain Larsin, who has already made several voyages to South Polar regions, will be in charge of the *Antarctic.*"

FROM a note in the *Times* we see that the British Consul-General at Marseilles reports that artificial indigo is killing the natural product on the French market. The artificial dye already regulates prices. The Badische Company have for two years been making indigo near Lyons for local consumption, while the Höchst Farbwerke are manufacturing synthetic indigo by another process in the same city. Artificial indigo is classed for Customs duty with natural indigo, and, since goods dyed with it are not required to be declared as such, they are sold at similar prices to goods dyed with natural indigo. Lyons dyers of cotton and woollen goods and Lyons dealers in indigo say that natural indigo has been ousted from many dye works, especially since artificial indigo has been prepared by crushing. Small dyers favour synthetic indigo, because they can buy small quantities as required and prices do not violently fluctuate. But, as the vegetable dye gives more solidity to the cloth, it is still likely to be used for military uniforms. Dr. Calmette, of Lille, is said to have patented a process for extracting indigotin from vegetable indigo up to thrice the quantity produced by the more primitive methods. It is curious that the Bengal Chamber of Commerce have recently had to ask the Havre Chamber to abolish a rule under which indigo tendered in that important terminal market must be guaranteed to be manufactured by the "old" process—a serious restriction in view of the many new processes recently introduced. The request has been complied with, and certificates will not be needed after April 1 next. From the Consular report on Frankfurt-on-Main for 1900 it appears that the Badische Company has borrowed 12,000,000 marks for the purpose of enlarging the production of artificial indigo and reducing its cost price. The company now claims to be able to supply one-sixth of the world's requirements. The Höchster Farbwerke are also extending their indigo business. Natural and artificial indigo are both 10 per cent. cheaper than last year, the policy of manufacturers being to keep the price of the synthetic rather below that of natural indigo.

A BUST of Dr. G. Armauer Hansen, the discoverer of the leprosy bacillus, was unveiled a few days ago by Prof. Visdal in the garden of the Museum at Bergen, in the presence of many Norwegian and foreign medical men. We learn from the *British Medical Journal* that an address was delivered by Prof. O. Lassar, of Berlin ; and Drs. Sandberg and Lie, of Bergen, also spoke. Congratulatory messages were sent from all parts of the world, and a letter from Prof. Virchow was read, in which the veteran pathologist, after expressing his regret at his inability to be present, went on to say that Dr. Hansen's work had definitively cleared up a large and difficult field of pathology, and that his name was known and celebrated throughout the whole world as a benefactor of mankind. Dr. Hansen was born in Bergen in 1841, and received his early education in the cathedral college of that town. His first investigation was to work out the significance of the so-called globi, or leprous cells of Virchow, and the results of his observations were published in 1869. He then obtained evidence of the contagious and specific nature of the malady, and the Medical Society of Christiania voted a sum of money for him to continue his research. Further investigations of the peculiar bodies (globi-brown corpuscles) previously referred to were rewarded by the discovery, in unstained preparations, of bacilli which were ultimately stained and proved to be the bacilli of leprosy. This discovery was made in 1873—that is, about ten years before the bacillus tuberculosis was made known to the world by Koch. For years Hansen has repeatedly tried to cultivate and inoculate the *Bacillus leprae*, which is known as Hansen's bacillus, but up to the present fruitlessly. One great point, however, has been gained—namely, that it is now practically admitted by all those engaged in the study and observation of leprosy, that the disease is contagious. In Norway, practical legislation on this basis has given the best results, and leprosy there is gradually and surely diminishing. Dr. Hansen celebrated his sixtieth birthday on July 29, and the tribute to his lifelong work and devotion above recorded will be gratifying to all lovers of science. The King of Norway has conferred upon him the distinction of Commander of the Order of Ola.

A LIST of nearly fifty papers accepted by the committee of Section A of the British Association, for reading at the forthcoming meeting at Glasgow, has been received since the publication of the forecast of the work of the other sections in last week's NATURE. Arrangements have been made for discussions on optical glass, to be opened by a paper by Dr. R. T. Glazebrook, F.R.S. ; energetics, to be opened by Dr. J. Larmor, F.R.S., with a paper on the relation of energetics to molecular theory ; and on the proposed new unit of pressure, to be opened by Dr. C. E. Guillaume. A report will be received from the committees on tables of certain mathematical functions, underground temperature, and the determination of magnetic forces. Lord Kelvin will read papers on the absolute amount of gravitational matter in any large volume of interstellar space, and on "Aepinus atomised." Prof. A. Gray, F.R.S., will read several papers, among the subjects being the influence of a magnetic field on the viscosity of magnetisable solids and liquids, elastic fatigue, and induced currents produced by starting a convection current. The following are among other physical papers :—On a new instrument for magnetic work on board ship, by Captain E. W. Creak, F.R.S. ; on the effect of sea temperature on the seasonal variation of air temperature of the British Isles, by Mr. W. N. Shaw, F.R.S. ; the law of radiation, by Dr. J. Larmor, F.R.S. ; the Michelson-Morley effect, by Prof. W. M. Hicks, F.R.S. ; sur les effets magnétique de la convection électrique, by Dr. V. Crémieu ; on the magnetic field due to the motion of a charged condenser, by Dr. F. T. Trouton, F.R.S. ; on resolving power in the microscope and telescope, by Prof. J. D. Everett, F.R.S.; on the interference of light from different sources, by Dr. G. J. Stoney, F.R.S. ; on a simple method of accurate surveying with a hand camera, by Prof. H. H. Turner, F.R.S. ; on the conduction of electricity through mercury vapour, by Prof. A. Schuster, F.R.S. ; hydrostatic pressure, by Prof. W. Ramsay, F.R.S.; comparison of constant volume and constant pressure scales for hydrogen between 0° and – 190° C., by Dr. M. W. Travers and Mr. G. Sentor; and the laws of electrolysis of alkali salt vapours, by Dr. H. A. Wilson. Mathematical papers are promised by Major P. A. MacMahon, F.R.S., Lieut.-Colonel A. Cunningham, Prof. A. G. Greenhill, F.R.S., Mr. C. V. Boys, F.R.S., and others. There will also be papers on astronomical subjects by Prof. H. H. Turner, F.R.S., Rev. A. L. Cortie, and Prof. D. P. Todd.

THE death-rates from accidents of various kinds in mines in the United Kingdom are dealt with in detail, both numerically and graphically, by Dr. Le Neve Foster, F.R.S., in his latest report, published as a Blue-book. The improvement which has been made may be judged from the fact that, whereas, in the early fifties, the underground death-rate was more than five per thousand, the average death-rate of the underground workers in 1900 was only 1·445. In 1851 about nineteen persons were killed per million tons of coal raised from mines, but last year the death toll on the same quantity of coal was reduced to four persons. Naked lights are still the principal cause of the accidents, more than seventy-five per cent. of the total number of deaths being ascribed to their use. In connection with the description of miscellaneous accidents we notice with interest the remark that during a severe thunderstorm in Staffordshire electricity passed down a shaft, and two men received a severe shock. Flashes of light were seen about pipes near the shaft. The following is a complete list of explosives which have passed the special test for use in mines, under conditions far more stringent than those of the ordinary list: ammonite, amvis, aphosite, cambrite, carbonite, electronite (second definition), kynite, Nobel Ardeer powder, Nobel carbonite, roburite (No. 3), saxonite, special bulldog, thunderite, and virite. As to electric safety lamps Dr. Le Neve Foster says the Sussmann Company have informed him that three or four thousand of their lamps are employed in collieries in the United Kingdom. It is of interest to notice that the total number of mechanical coal-cutters in use in the United Kingdom in 1900 was 311, of which 240 were driven by compressed air and 71 by electricity. The quantity of coal got out by these cutters was 3,321,012 tons. Gold mining is being successfully carried on in North Wales; 19,463 tons of quartz crushed at St. David's mine yielded on an average about 14dwts. of gold to the ton, and the net profits for the year amounted to nearly 40,000*l*.

THE Meteorological Office pilot chart of the North Atlantic and Mediterranean for the month of September shows that West Indian hurricanes have a tendency to keep further out on the ocean in this month than in July and August, the mean point of curvature being in about 28° N., 72° W., and individual cases have been known to curve in the same latitude as far as 52° W. Comparatively few of the centres enter the Caribbean Sea, and of those that do nearly all keep to the northern side. The origin of some of these storms is attributed to shallow disturbances moving westward in the vicinity of the Cape Verde Islands, associated with unsettled weather and strong winds. Hurricanes are rarely experienced on the north coast of South America, Curaçoa island being visited in September 1877, the only instance in seventy years. Local peculiarities in the winds on the African and American coasts are referred to, and there is a summary of the features of the winds of the Grecian Archipelago and also of the currents of the same region. An inset chart represents the third type of thunderstorm conditions over the British Isles, namely those which appear as secondaries to depressions in the north. The ice reports show that in July there was a diminution in the number of bergs seen on the Banks of Newfoundland, few being reported south of the latitude of St. John's. In the strait of Belle Isle and to a distance of about 200 miles north-eastward of Belle Isle itself, the steamer route was infested with great quantities of ice, heavy field ice and large bergs rendering navigation very difficult and tedious. One steamer was detained four days in the ice, another was obliged to retreat and make for the gulf of St. Lawrence by the south coast of Newfoundland. The most southern ice was in 41° N., 47° W., a very small piece, 20 feet by 40 feet, and only 4 feet out of the water.

SOME further particulars are given in *Symons's Meteorological Magazine* for August of the severe thunderstorm which occurred in London on July 25. It was in many respects similar to that which occurred on July 27 last year; both storms occurred after a period of great heat, and after an absolute drought of nearly three weeks. The barometric trace showed distinct disturbance at the two periods of greatest intensity, but there was an absence of the typical thunderstorm curve. The rainfall (2·85 inches in about four hours) has been exceeded on only one day in the forty-four years since the commencement of the Camden Town record, viz. in the great thunderstorm of June 23, 1878, when 3·28 inches of rain fell in an hour and a half. The greatest intensity of rainfall in the recent storm was ·23 inch in two minutes, being at the rate of 6·90 inches per hour. It is remarkable, considering the vividness of the lightning and its great frequency, that so little damage was done.

WE have received the Report of the Director of the Government Observatory, Bombay, for the year ending March 31, 1901. The labours of the observatory are directed in the first place to observations in magnetism, meteorology and seismology, and the discussion and publication of the results; and secondly to astronomical observations for the purposes of timekeeping and navigation. The Dines' pressure-tube anemometer gives very satisfactory results, and serves as a valuable check upon the Robinson velocity anemograph. The seismograph registered twenty-nine earthquakes during the year, besides 447 small and local movements. Among the various important duties performed at the observatory may be mentioned the rating of the chronometers of merchant ships which arrive at the port, and the transmission of weather and other reports to various newspapers and public bodies.

THE *Electrical Review* states that experiments are about to be made on the River Lea with the view to the adoption of a system of electric haulage of barges similar to that in use in France. A power station has been erected at Hertford, from which the current will be supplied by wires supported on poles to a trolley running on a narrow-gauge track along the towpath. It is anticipated that the barges will be towed at a speed of from three to four miles an hour at less cost than by horse traction. The system is to extend to Walthamstow, a distance of eighteen miles.

THE improvements in the locks and bridges, and the deepening of the waterway of the Aire and Calder Navigation, which have been carried out in recent years, have enabled for the first time in the history of the undertaking a sea-going steamer to navigate the canal from Goole to the middle of Yorkshire. The *Pioneer*, after a voyage of 500 miles from Fowey in Cornwall, delivered a cargo of 130 tons of china clay at Leeds. This vessel is 98½ feet long, 17¾ feet beam and draws 7½ feet of water. After the inception of the Manchester Ship Canal, several schemes were proposed for making a ship canal from the Humber to the centre of the manufacturing districts of Yorkshire. A proposal to establish a port at Wakefield was enthusiastically received at a meeting of representatives of the West Riding, the estimated cost of the scheme being six million pounds. The financial results of the Manchester Ship Canal have not given encouragement to the further prosecution of these schemes.

DURING the past few years a series of remarkable papers by Prof. Karl Pearson and his coadjutors has been published by the Royal Society in the *Philosophical Transactions* and *Proceedings*, on the foundations of a very comprehensive mathematical theory of evolution. Mr. R. Worthington (*Journal Anat. and Phys.* vol. xxxv. 1901, p. 455) gives some account of that portion of Prof. Pearson's work which bears an osteology as a branch of physical anthropology, in such a manner as shall be intelligible to non-mathematical readers. The application of mathematical analysis to the problems of evolution was introduced by Dr. Francis Galton and perfected by Prof. Karl Pearson, and the results already obtained are of such importance that biologists cannot afford to neglect them.

THAT portion of the brain where "impulses of diverse nature, coming from all regions of the body and from all the sense organs, may meet and play upon each other," that *sensorium commune* for which the ancient philosophers sought in vain for so many ages, is a region of the hemisphere which is surely worthy of a distinctive name. Such is the plea of Prof. G. Elliot Smith (*Journal Anat. and Phys.* vol. xxxv. 1901, p. 431), who suggests that it might be called the *pars crescens* (hemisphærii), in reference to the peculiar characteristic of its rapid expansion in the Mammalia; but instead of selecting a new phrase he prefers to use the term *neopallium*, as at every epoch in the history of the mammal this part of the brain shows a progressive increase in size, whereas the other superficial parts of the hemisphere become relatively or actually smaller and may even disappear almost entirely without any vital injury to the individual.

To the *Proceedings* of the Royal Physical Society of Edinburgh for 1899–1900, Dr. G. Wilson contributes a preliminary notice of the first appearance of the lung in the Australian lung-fish (*Ceratodus*), and a second on the embryonic kidney of the same. Dr. D. Hepburn notices certain mammalian remains (all referable to existing types) recently collected in a cave in Sutherlandshire.

IN the August number of *The Zoologist*, Mr. R. B. Lodge describes an interesting arrangement by means of which he obtained automatic photographs of the purple heron and spoonbill on the nest. A camera was fixed near the nest, provided with a string and catch so arranged that when the bird alighted it caused a "snap-shot" of itself to be taken. Curiously enough, before the photo of the purple heron was obtained, one of a marsh-harrier, which had come to rob the nest, was taken. With the aid of a flash-light the arrangement would be available for night use.

THE Imperial Department of Agriculture for the West Indies issues a continuation of its publications relating to the insects injurious to cultivators in these islands, in the form of a pamphlet on the "Scale Insects of the Lesser Antilles," of which a second instalment is to follow. The West Indian scale insect and allied members of the Coccidæ form, in spite of their minute size, some of the most troublesome pests against which the West Indian planter has to contend. According to the author, Mr. H. Maxwell-Lefroy, various poisonous or resinous washes, applied as spray, form the most efficient remedies; a list of those most suitable to each kind of crop is appended.

To the January issue of the *Proceedings* of the American Philosophical Society, Dr. R. W. Shufeldt contributes a further instalment of his series of dissertations on avian osteology, this contribution dealing with the skeleton of the cuckoos. Although not committing himself definitely to any opinion, and dwelling upon the imperfect state of our knowledge of the bony structure of this large group of birds, the author is inclined to confirm the view of the near relationship of the cuckoos to the plantain-eaters and bee-eaters. He believes, however, that several families of "picarian" birds "have a cuckoo-vein running all through them, strongly impressed in some cases, barely discernible in others. Indeed, these groups of birds seem to have arisen from some very ancient and common stock, but by the extinction of numerous related types . . . it has left in recent times the most puzzling collection that the systematist has to deal with."

THE second part of vol. vii. of the *Transactions* of the Norfolk and Norwich Naturalists' Society contains a number of papers, for the most part connected with the natural history of the county. Prof. A. Newton has a note on some bones of the crane from the Norfolk fens, and this is followed by an interesting account from the pen of Mr. T. Southwell of the breeding of that bird in the county. Documentary evidence is cited to prove that in 1543 cranes nested in Hickling Broad, and about the same time in the Cambridgeshire fens. Dr. S. F. Harmer describes and figures a dolphin taken in Cornwall, the flanks of which showed certain peculiar scratches. At first it was thought these might be due to the hooks of a cuttlefish, but subsequent investigation tended to show that they were made by other individuals of the same species, probably during the pairing season. The author is, however, of opinion that somewhat similar markings seen on other cetaceans may be due to the struggles of the cuttles on which they feed.

THE bulk of Part I of the Bergen Museum "Aarbog" for 1901 is occupied by a list of the Coleoptera and Lepidoptera of the Bergen district, drawn up by Mr. J. S. Schneider, and illustrated with a coloured plate. Of more general interest is an article by Dr. O. Nordgaard on the hydrography of the North Sea, largely based on the observations of two sealing captains. As the result of the investigations it appears that the effect of the Gulf Stream on the North Sea has been very variable during the last four years of the century. The favourable condition of the ice in 1897 and 1898 seems to have been owing to an influx of warmth characterising these years, while the unfavourable conditions noticed in 1899 and 1900 were due to a lack of the same influence. The years 1898 and 1899 severally represented indeed the maximum and minimum in this respect. This is confirmed by the fact that in the former year the development of the "plankton" was much above the average. Allusion is made to the influence of such temperature variations on the cod and herring fishery, as well as on sealing.

MR. W. W. DAVIS has a paper in "Studies from the Yale Psychological Laboratory" (vol. viii.), on some relationships between temperament and effects of exercise. His tests and observations are scarcely sufficient to establish very definite relations, but the conclusions at which he arrives are not without interest. The observations suggest that nervous persons, in training for the development of strength, require light practice, and phlegmatic persons require vigorous practice. The phlegmatic type of temperament is apparently characterised by the presence of much reserve energy of muscle and nerve cell. The nervous type has less reserve energy but a greater ability to use the energy at hand. It is not difficult to apply these principles to practical physical training. They make necessary on the part of the trainer a personal knowledge, secured either by means of observation or experiment, of the temperament of each man under his charge. The amount of work necessary in each case can then be apportioned with much greater exactness. Mr. Davis points out that it seems quite as certain that there may also be a direct application of these principles in the realm of pedagogy. The experiments show that, in the development of strength, mental factors are more necessary than muscular factors. If the principles can be applied to the development of will power and co-ordination, why not to memory, association, imagination, and reasoning as well? All have a physiological basis, and in so far all are governed, in a given individual, by the same principles of growth. There is at least a wide field here for inquiry and practical investigation. There can be no doubt that the present system of secondary and collegiate instruction, which requires an equal amount of work from all pupils, causes much harm to many individuals. Mr. Davis's results emphasise the importance of recognising the individual in the training of either physical or mental ability.

AN elementary text-book of zoology, which has been prepared for the Cambridge Natural Science Series by Mr. A. E. Shipley of Cambridge and Prof. MacBride of McGill University, Montreal, will be published on September 9 by the University Press in England and the Macmillan Co. in New York.

A CATALOGUE of works on chemistry and chemical technology in the library of the Patent Office has just been published as No. 6 of the Patent Office Library Series. The list comprises the titles of 885 works (79 serials, 806 text-books, &c.), representing about 3300 volumes. The titles are classified under 146 headings and sub-headings, so that students using the Patent Office library can readily find the works available upon any subject in chemistry.

THE United States Board on Geographic Names has issued a special report giving the accepted spellings of 4000 geographical words used in the Philippine Archipelago. When the islands were acquired by the United States in 1898, and new charts had to be prepared, much confusion existed as to the geographical orthography—Spanish, Malay, American and English methods of spelling native names being in use. Acting upon the advice of the Board, the U.S. Hydrographic Office adopted the spelling upon the best Spanish official charts and maps, and a list of about 4000 coastwise names was compiled, chiefly from Spanish sources. This is the list which has now been published. Another list, containing about 6000 Philippine geographical names, was prepared independently by Father Algue, director of the Jesuit Observatory at Manila, and these have been accepted by the U.S. Coast and Geodetic Survey for the atlas of the Philippine Islands shortly to be issued. To ensure uniformity, Father Algue has revised the present list, so that all the names in it now agree with those used in the Coast Survey atlas.

THE additions to the Zoological Society's Gardens during the past week include a Bonnet Monkey (*Macacus sinicus*) from India, presented by Mr. H. S. Kemp; a Japanese Deer (*Cervus sika*) from Japan, presented by Sir Douglas Brooke, Bart.; a Short-headed Phalanger (*Petaurus breviceps*) from Australia, presented by Captain Gordon Wilson; two Common Kingfishers (*Alcedo ispida*), British, presented by Mr. W. Milne; two Rosy-faced Love-birds (*Agapornis roseicollis*) from South Africa, presented by Mrs. Harry Blades; an Alligator (*Alligator mississippiensis*) from Southern North America, presented by Mr. J. Foster Spence; a New Zealand Parrakeet (*Cyanorhamphus novae-zealandiae*), a One-wattled Cassowary (*Casuarius uniappendiculatus*), a Westermann's Cassowary (*Casuarius westermanni*) from New Guinea, two White-breasted Sea Eagles (*Haliastur leucosternus*) from Australia, an Angulated Tortoise (*Testudo angulata*) from South Africa, two Pale-headed Tree Boas (*Epicrates angulifer*) from Cuba, a Common Roe (*Capreolus caproea*), European, two Getulian Ground Squirrels (*Xerus getulus*) from Morocco, deposited; a Spot-wing (*Psaroglossa spiloptera*) from India, purchased; a Burrhel Wild Sheep (*Ovis burrhel*), an Axis Deer (*Cervus axis*), born in the Gardens.

## OUR ASTRONOMICAL COLUMN.

### ASTRONOMICAL OCCURRENCES IN SEPTEMBER.

Sept. 1. 7h. 36m. Minimum of Algol (β Persei).
4. 16h. 2m. to 16h. 58m. Moon occults ε Tauri (mag. 3·7).
6. 10h. 48m. to 11h. 13m. Moon occults 71 Orionis (mag. 5·1).
7. Pallas in opposition to the sun.
9. 14h. 32m. to 15h. 25m. Moon occults κ Cancri (mag. 5·0).
12. Perihelion passage of Encke's comet.
15. Venus. Illuminated portion of disc = 0·795.
15. Mars. ,, ,, ,, = 0·933.
15. 15h. Venus in conjunction with the moon. Venus 1° 15′ N.
18. 12h. 30m. Minimum of Algol (β Persei).
21. 9h. 19m. ,, ,, ,,
27. 6h. 5m. to 9h. 13m. Transit of Jupiter's Satellite III.
28. 6h. 1m. to 6h. 41m. Moon occults 62 Piscium (mag. 6·0).

NEW ELEMENTS OF COMET 1901 (I.).—From observations made in May and June at the Cape and Cordoba (*Astronomische Nachrichten*, Bd. 156, No. 3734), Herr H. Thiele has computed a new set of elements for this comet, giving the following orbit:—

$$T = 1901 \text{ April } 24{\cdot}28845 \text{ Berlin M.T.}$$

$$\left.\begin{array}{rcl} \omega &=& 203^\circ\ 2'\ 15''{\cdot}1 \\ \Omega &=& 109\ 38\ 53{\cdot}1 \\ i &=& 131\ \ 4\ 49{\cdot}3 \end{array}\right\}1901{\cdot}0$$

$$\log q = 9{\cdot}388827$$

An ephemeris is also given founded on these revised elements, so that search for the now faint comet may be continued.

*Ephemeris for 12h. Berlin Midnight.*

| 1901. | | | R.A. h. | m. | s. | | Decl. ° | ′ | ″ |
|---|---|---|---|---|---|---|---|---|---|
| Aug. | 28 | ... | 8 | 36 | 23·21 | ... | +11 | 1 | 14·2 |
| Sept. | 1 | ... | | 38 | 55·36 | ... | 10 | 58 | 38·1 |
| | 5 | ... | | 41 | 16·77 | ... | 10 | 56 | 4·5 |
| | 9 | ... | | 43 | 27·06 | ... | 10 | 53 | 38·9 |
| | 13 | ... | | 45 | 25·77 | ... | 10 | 51 | 26·9 |
| | 17 | ... | | 47 | 12·35 | ... | 10 | 49 | 34·0 |
| | 21 | ... | | 48 | 46·28 | ... | 10 | 48 | 6·1 |
| | 25 | ... | | 50 | 7·06 | ... | 10 | 47 | 8·3 |
| | 29 | ... | | 51 | 14·12 | ... | 10 | 46 | 45·9 |
| Oct. | 3 | ... | | 52 | 6·91 | ... | 10 | 47 | 4·2 |
| | 7 | ... | | 52 | 44·72 | ... | 10 | 48 | 8·7 |
| | 11 | ... | 8 | 53 | 6·73 | ... | +10 | 50 | 5·5 |

BRIGHTNESS OF THE SOLAR CORONA, JANUARY 22, 1898.—In a paper read before the Royal Society, Prof. Turner gives a preliminary description of the results obtained from an investigation into the law of variation of the brightness of the solar corona in relation to the distance from the sun's limb (*Proc.* Roy. Soc., vol. lxviii. pp. 36–44). Instead of the rotating sectors used in previous similar investigations, a graduated gelatine wedge has been employed to diminish the intensity of the comparison beam. An entirely new method has been adopted for representing the results, which has led to the suggestion of a more satisfactory law for the variation of coronal brightness with the distance from the sun.

Up to the present time the relation usually adopted was that formulated by Prof. Harkness in 1878, viz.:—

$$\text{Brightness} \propto \frac{1}{(\text{distance from sun's limb})^2};$$

but this was not in agreement with the visual measures of Thorpe and Abney in 1886 and 1893.

The new relation now suggested is—

$$\text{Brightness} \propto \frac{1}{(\text{distance from sun's } \textit{centre})^6}.$$

Tables giving the measures along six different radii show sufficiently small residuals to warrant the formula being provisionally used to express the variation. It is found that a constant is required to be added to the formula, the physical interpretation of which is most probably the sky-glare present during totality, and which would necessarily give a certain